LAND USE ALTERNATIVES EVALUATION REPORT

ORANGE COUNTY LAND USE PLAN 2050

ORANGE COUNTY LAND USE PLAN

Guiding Our Future 2050

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ABOUT THIS REPORT

In 2023, Orange County launched a major planning effort—called the Orange County Land Use Plan 2050 — to establish a cohesive, county-wide land use vision for the future and an actionable strategy to achieve that vision. This planning process will result in a rewrite of one of Orange County's key policy documents—the Land Use Plan. For more information about the Orange County Land Use Plan 2050 planning process, please visit the project website at: https://www.orangecountylanduseplan.com/

The Orange County Land Use Plan 2050 is a multi-phase project. The land use alternatives, summarized in this report, are a component of Phase 4, which builds off community engagement and technical analyses completed during Phases 1-3 and informs the development of Phase 5 - the final phase of the project that will result in the complete plan. This report shares the methodology and outcomes of the land use alternatives process that will be utilized in developing the policy guidance and the Conservation and Growth Map (i.e., the Future Land Use Map) in the Land Use Plan 2050. This report describes the land use alternatives modeling process – the technical inputs, the outputs, the methods of receiving feedback, and generally how the community feedback received on alternatives will shape the final Orange County Land Use Plan 2050.

PURPOSE OF LAND USE ALTERNATIVES

What is Land Use Alternatives Modeling?

Land use alternatives modeling (also called "scenario planning") is the process of comparing multiple future, hypothetical, land use patterns across a given study area. This is generally achieved by creating different versions of the Future Land Use Map (the "alternatives"), modeling the development potential and amount of land conserved in each alternative, and then comparing metrics from each of them – such as how much residential or non-residential development capacity exists or how much land is conserved or left undeveloped. In its simplest form, land use alternatives modeling attempts to answer the question: **What are the impacts of building one type of development versus another, or of conserving the land instead?** This allows communities to "test" policy approaches and their potential outcomes, compare the alternatives, and help discover the preferred land use policy direction for a community. This is typically done through the identification of the preferred components of each alternative and the creation of a new Future Land Use map that incorporates those components.

To facilitate an apples-to-apples comparison between the alternatives, a consistent palette of Future Land Use classifications is used and every parcel in the study area is assigned one of these classifications for each alternative. Classifications are applied in different ways or to different areas based on the policy direction being tested in the given alternative. In many cases, a parcel may carry the same assignment through each of the alternatives. Due to the fact that these are hypothetical alternatives that measure outcomes across the entire study area, **the collective impact of all parcels in an alternative taken together is most critical to understand, especially in comparison to the other alternatives.**

For Orange County, three primary and quantifiable variables are modeled for each alternative: the **amount of land that is conserved**, the **total number of housing units** that can be built, and the **total square footage of non-residential building space**[1] that can be constructed. Other qualitative variables are assessed, including the impacts each alternative generates for protecting the natural environment, transportation, affordable housing, and climate impacts. Another important part of these alternatives is the manner in which water and wastewater serves different developments. Currently, all developments within the county are limited to private

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[1] Floor Area Ratio (FAR) is the variable used to define total possible non-residential building space, and effectively caps the size of a building based on the size of the parcel. The FAR is the ratio of the total square footage in a building to the total size of the parcel it is built upon. E.g. a 5,000 square foot building on a 10,000 square foot parcel has a FAR of 0.50.

wells and septic systems. These alternatives explore other methods, including private community systems and extension of public water and wastewater to serve new areas.

Ultimately, generating the results of the different alternatives is not the final objective; taken together the results are a tool for residents, planners, and elected officials to evaluate how aspects of one alternative might be preferable in certain ways, and less desirable in others. Any land use decision results in tradeoffs of some kind – for example, a policy direction that prioritizes land conservation first and foremost will necessarily provide fewer housing opportunities, and vice versa. The land use alternatives help to identify those trade-offs by incorporating a quantitative and qualitative analysis. The final goal is to have a community dialogue about the alternatives to inform the creation of preferred land use policy direction for the county.

Key Land Use Planning Question that the Alternatives Help Answer

In this process, a key question was developed that can be answered through the modeling, evaluation, and discussion of the land use alternatives. This is the critical land use planning question that would benefit from alternatives analysis and testing with the public. This question aligns expectations, so everyone involved has a common understanding of the purpose and intent of the land use alternatives. It also provides a focus for the analysis, to ensure that the testing of the alternatives includes a manageable number of variables and results in meaningful outcomes. Building off the key vision themes identified from the first round of engagement, the following key question was developed.

Key Question:

Which aspects of the land use alternatives best achieve the balance of sustainable development in Orange County?

The Community's Role in Evaluating the Alternatives

Stakeholder engagement is critical to this effort. The primary purpose of this part of the planning process is to model different land use alternatives, analyze their results and impacts, and then obtain community input about which elements of each alternative are desirable or undesirable. The land use alternatives from this process will be shared with the public as part of Community Engagement Window #2, scheduled for the fall of 2024. This community feedback will be used to guide the development of the Orange County Land Use Plan 2050.

The Land Use Alternatives and the Conservation and Growth Map

This modeling process is not expected to prioritize one alternative over the other three. Instead, the differences between the four alternatives are meant to spur conversations in the community and provide a basis for comparing, and prioritizing through future policy, the tradeoffs that exist between them. Based on community feedback, preferred aspects of each alternative will be combined to create the Land Use Plan 2050, particularly the **Conservation and Growth Map** (i.e., the new Future Land Use Map) for Orange County. The Conservation and Growth Map will include associated **Land Use Classifications,** which will provide guidance on appropriate primary and secondary uses, associated densities, and alignment with current zoning based on the Unified Development Ordinance.

A Future Land Use Map is an aspirational map that provides policy guidance for future land use decisions made by the County. The Future Land Use Map, in combination with the policy recommendations of the Land Use Plan 2050, is also intended to inform and direct relevant changes to Orange County's Zoning Map and Unified Development Ordinance, which are the legal documents that determine what developments are allowed where in the county and regulate the standards for new development.

Planning and Zoning Jurisdiction for Study Area

The land use alternatives modeling considers areas within Orange County's planning and zoning jurisdiction (the rural or unincorporated areas) and excludes areas within the municipalities of Carrboro, Chapel Hill, Durham, Hillsborough, Mebane, and their respective Extra-Territorial Jurisdictions (ETJs). The study area includes the Rural Buffer located within the Joint Planning Area (JPA) created by the Orange County – Chapel Hill – Carrboro Joint Planning Land Use Plan and Agreement. Other areas included in the JPA, such as the 10-year and 20-year transition areas near Chapel Hill and Carrboro, are not included in the study area as the expectation is that these areas will one day become part of these municipalities. To learn more about the Joint Planning Land Use Plan and Agreement, see the associated documents found at this link: https://www.orangecountync.gov/3031/Long-Range-Comprehensive-Planning.

ORANGE COUNTY HYPOTHETICAL LAND USE ALTERNATIVES

Summary and Description of the Land Use Classifications

Orange County's currently adopted Future Land Use Map was created as part of the 2030 Comprehensive Plan[2]. As part of the Land Use Plan 2050 process, the Future Land Use Map classifications from the 2030 Comprehensive Plan were the starting point for developing the land use classifications used in the alternatives modeling. A comparison table of the changes to the classifications is available in the Methodology section in this report's Appendix.

The table below displays a summary of the land use classifications used for the hypothetical alternatives, color-coded according to the maps in the following section. A description of the land uses and intended utility services (water and wastewater) for each land use classification is provided below the table.

Table 1. Summary of Land Use Classifications

Updated Classifications for Hypothetical Land Use Alternatives
Mixed Use Center
Economic Development Area
Urbanizing Residential
Low Density Neighborhood
Rural Activity Node
Rural Conservation Neighborhood
Rural Residential
Rural Buffer

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[2] For more information about the 2030 Comprehensive Plan, see the Orange County Planning & Inspections website at this link.

MIXED USE CENTER

- **Land Use**: These areas include land that is suitable and ideal for development as a combination of residential and non-residential uses, which can be vertically or horizontally mixed. Mixed Use Centers may provide a variety of home types (attached, detached, single- and multi-family options, etc.) and moderate intensity commercial or office uses such as retail shops, offices, or institutional uses.
- **Water and Wastewater:** Such developments generally require public water and sewer utilities, and these areas are close enough to municipal limits to reasonably expect that these services could be extended and would require a petition for voluntary municipal annexation.

ECONOMIC DEVELOPMENT AREA

- **Land Use**: Land that is appropriate for commercial, manufacturing and other industrial uses. Economic Development Areas are targets for economic development activity consisting of light industrial, distribution, office, service/retail uses, and flex space (typically one-story buildings designed, constructed, and marketed as suitable for use as offices, but able to accommodate other uses, e.g., warehouse, showroom, manufacturing assembly or similar operations.) These areas may also support limited amounts of multi-family housing. Economic Development Areas are located adjacent to interstates and major arterial highways.
- **Water and Wastewater:** These areas can maximize development potential if access to public utilities is available, requiring a petition for voluntary annexation. Some level of economic use may also be supported on these lands with private wells and septic systems.

URBANIZING RESIDENTIAL

- **Land Use:** These lands are identified by Hillsborough and Mebane as locations for potential future growth either within their planning and zoning jurisdictions or long-range planning areas[3] and could accommodate urban or suburban densities.

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[3] Planning and zoning jurisdictions are defined as lands that include the corporate limits and extraterritorial jurisdictions (ETJ) of the municipalities. In contrast, the long-range planning area includes the planning and zoning jurisdiction and can include lands that are outside of the planning and zoning jurisdictions where the municipalities may anticipate growth and annexation in the future.

- **Water and Wastewater:** The expectation is that these lands will be annexed through the voluntary petition process into one of the local municipalities and served with public utilities.

LOW DENSITY NEIGHBORHOOD

- **Land Use:** These are areas that were once planned for future municipal development but are no longer within the long-range public utility service areas of Hillsborough and Mebane. These areas can serve as transition or "buffer" areas between Urbanizing Residential and Rural Residential lands.
- **Water and Wastewater:** These areas are only in unincorporated Orange County (outside of the Hillsborough and Mebane urban service boundaries) and are not expected to be served with public utilities, instead being served only by private wells and septic or, potentially, community wells and sewer systems.

RURAL ACTIVITY NODE

- **Land Use:** Land focused on designated rural road intersections that provides rural-scale nonresidential development opportunities that can or do serve the surrounding community. Rural Activity Nodes are an appropriate location for small-scale industrial uses that do not require urban-type services; community or institutional uses; and/or small-scale commercial uses, which may necessitate a slightly higher density than surrounding Rural Residential Areas.
- **Water and Wastewater:** These areas are served by private wells and septic systems or, potentially, community wells and sewer systems.

RURAL CONSERVATION NEIGHBORHOOD

- **Land Use:** Land suitable for residential development with a requirement to set aside open space in permanent conservation status. Home sites are clustered together to preserve the most environmentally sensitive areas of the site, limit the extent of impervious surfaces, and maintain a low rural density across the development, while facilitating the development of smaller lots than otherwise achievable in rural areas of the county.
- **Water and Wastewater:** These neighborhoods could potentially be served by public water and sewer services in some areas. It is assumed that most will rely on private wells and septic systems or, more likely, community systems that serve all the homes in the neighborhood.

RURAL RESIDENTIAL

- **Land Use:** Land in the rural areas of the county where the prevailing use is either low density single-family residential, or working lands (agriculture, forestry, horticulture).
- **Water and Wastewater:** Homes in these areas are served by individual private wells and septic systems.

RURAL BUFFER

- **Land Use:** Land which is rural in character, and which should remain rural, supports low-density residential uses, and does not require public water and sewer utilities. This category was established through the joint planning processes of the Joint Planning Land Use Plan and Agreement (involving Carrboro, Chapel Hill, and Orange County) and the Water and Sewer Management, Planning, and Boundary Agreement (or WASMPBA, involving Chapel Hill, Carrboro, Hillsborough, Orange County, and OWASA). It intends to create a buffer between the urban development of Carrboro and Chapel Hill and the rest of the county through rural, low-density housing and agricultural uses.
- **Water and Wastewater:** Properties in these areas are served by individual private wells and septic systems.

In addition to the previous land use classifications, the critical and protected water supply watershed overlays were also included in the modeling assumptions. The specific assumptions applied to each classification may vary by land use alternative. The assumptions for conservation lands, residential densities, and non-residential Floor Area Ratios for each classification and for each alternative are shared within tables starting on page 17.

Description of Land Use Alternatives

The four land use alternatives were developed from key influences evaluated in Phases 1 – 3 of the Orange County Land Use Plan 2050. This includes, but was not limited to, public feedback gathered during Community Engagement Window #1; analysis of existing conditions and data as part of the Fact Book; and policy influences from Orange County plans such as the Strategic Plan, Climate Action Plan, and One Orange Countywide Racial Equity Framework. For more information on these resources, please see the project website. The four alternatives include:

- Alternative #1: Continue Current Policies
- Alternative #2: Enhance Agricultural and Environmental Protections
- Alternative #3: Add Low-Impact, Rural Conservation Neighborhoods in Strategic Locations
- Alternative #4: Add Higher Intensity, Mixed-Use Centers in Strategic Locations

Each of these is described on the following pages.

Alternative #1: Continue Current Policies

This alternative represents a baseline scenario that reflects the policy intent of the current 2030 Comprehensive Plan and Future Land Use Map (FLUM). To facilitate an apples-to-apples comparison, minor adjustments were made to the currently adopted FLUM to produce Alternative #1, including combining some duplicative classifications (as outlined in the methodology shared in the Appendix), updating the growth or planning areas defined for Hillsborough and Mebane, as well as the addition of Blackwood Station as a Rural Node (which effectively aligns this map with the intentions of the 1981 Joint Planning Agreement (JPA).[4]

Figure 1. Example of Subdivision in Rural Buffer (Aerial of Oxbow Crossing Rd, Bethel Hickory Grove Church Rd, and Dairyland Rd.)

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[4] The Joint Planning Agreement sets out subclassifications within the Rural Buffer that allow for different types of land uses, including a Rural Activity Node.

Alternative #2: Enhance Agricultural and Environmental Protections

This alternative tests a policy direction that further protects priority agricultural, environmental, watershed, and rural lands by requiring larger lot sizes for new residential development. Because this alternative effectively protects more land from development than alternative #1, it will limit the extent of new housing opportunities in unincorporated Orange County. The assumption is that new housing needs, particularly new affordable or denser housing, will be accommodated within the municipalities.

Figure 2. Example of Large Lots (Aerial of Lolly Ln. near Mebane Oaks Rd.)

Alternative #3: Add Low-Impact, Rural Conservation Neighborhoods in Strategic Locations

Alternative #3 tests a policy that allows for the creation of Rural Conservation Neighborhoods, also known as conservation subdivisions, in suitable locations within the County's jurisdiction. Suitability for these neighborhoods is determined by adhering to a set of site requirements and constraints: completely outside of critical water supply watershed areas, avoiding VAD and EVAD parcels (Voluntary Agricultural Districts and Enhanced Voluntary Agricultural Districts), largely avoiding protected water supply watershed areas, and largely avoiding conservation priority habitat patches and corridors.[5] Rural Conservation Neighborhoods could include a mix of housing types and possibly a limited amount of neighborhood-serving commercial opportunities as well. Conservation subdivisions would protect key ecologically valuable areas of the site and would be required to set aside a significant portion of the land (60%) as permanently protected open space. Conservation subdivisions would likely require changes to wastewater policies to allow community water and/or wastewater systems to serve the development. This alternative also includes a new Economic Development Area near Efland in western Orange County to provide greater economic development opportunities within the county.
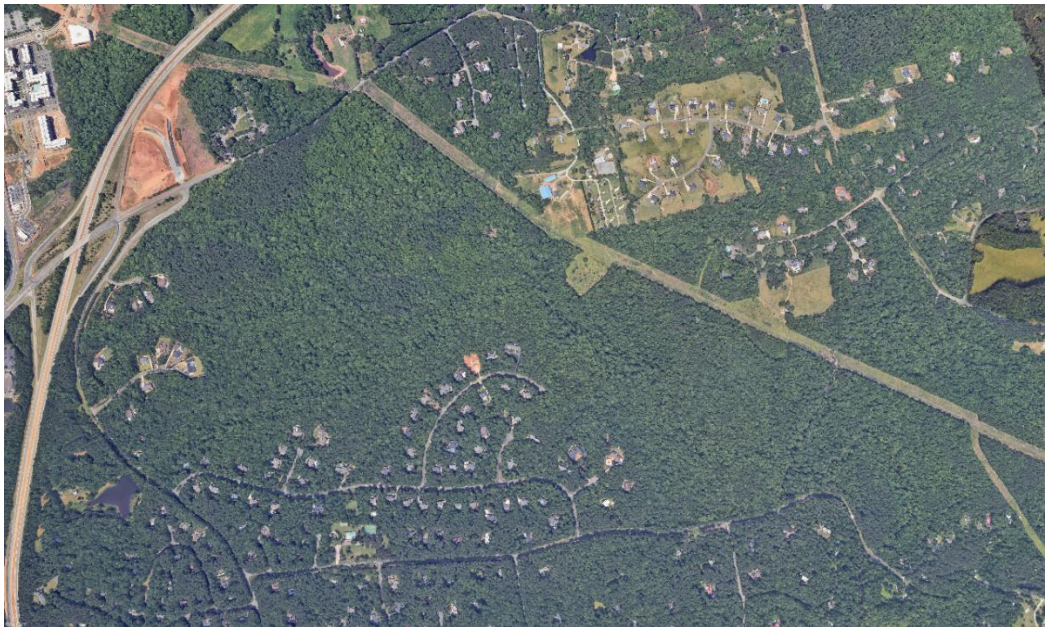
Figure 3. Example of Rural Conservation Neighborhood (Aerial of Whitfield Rd. and Creekwood Dr. near I-40)

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[5] For more information about this effort, please refer to the Eno-New Hope Conservation Plan.

Alternative #4: Add Higher Intensity, Mixed-Use Centers in Strategic Locations

This final alternative tests a policy direction that focuses on increasing available land that could include a mix of higher-density housing types and commercial/employment areas. This approach considers the same constraints as Alternative #3 (critical and priority watersheds, VAD and EVAD parcels, and conservation corridors), except that this alternative requires *adjacency* to municipal limits to improve the feasibility of extending public utilities and a larger amount of land that could be assembled for development. Mixed use centers will most likely require municipal services to serve the development, although community systems could possibly be an option where municipal services are not attainable. In all cases, all utility connections are subject to the approval of the utility provider, as the County does not make or provide these services directly. Like #3, this alternative also includes a new Economic Development Area near Efland in western Orange County to provide greater economic development opportunities within the county.


Figure 4. Example of Mixed-Use Center (Aerial of Southern Village, Market St. and U.S. 15-501)

Assumptions for Land Use Alternatives

The assumptions for the land use alternatives are established first through alternative #1 using the currently adopted Orange County Future Land Use Map (FLUM) and corresponding Zoning District densities and open space requirements. Alternative #1 serves as the baseline for the other three alternatives, with each intended to test a specific approach for land planning that is different from the current policy direction. The following tables provide the specific assumptions used to develop these alternatives. These include:

- **Percentage of Open Space**: Estimated percentage of land permanently protected in common open space for each land use classification. For alternatives #1, #2, and #4, the open space assumption (33% of site) carries forward current policy. For #3, this assumption is increased to 60% of site.
- **Percentage of Residential Development to Non-Residential Development**: The ratio of land available for residential development compared to the land available for non-residential development on a given parcel by each land use classification.
- **Residential Acres per Dwelling Unit:** The number of acres required to accommodate a new dwelling unit. More units are accounted for in #3 and #4 due to higher density development assumptions.
- **Non-Residential Floor Area Ratio (FAR):** The amount of nonresidential development (commercial, office, industrial, institutional, etc.) that can be accommodated on a given parcel. A floor area ratio is calculated as the ratio between the total amount of usable floor area of a building to the total area of the lot on which the building is located.

Four story building with footprint that covers 1/4 of the site

Total area of four building floors is equal to total site area, FAR = 1
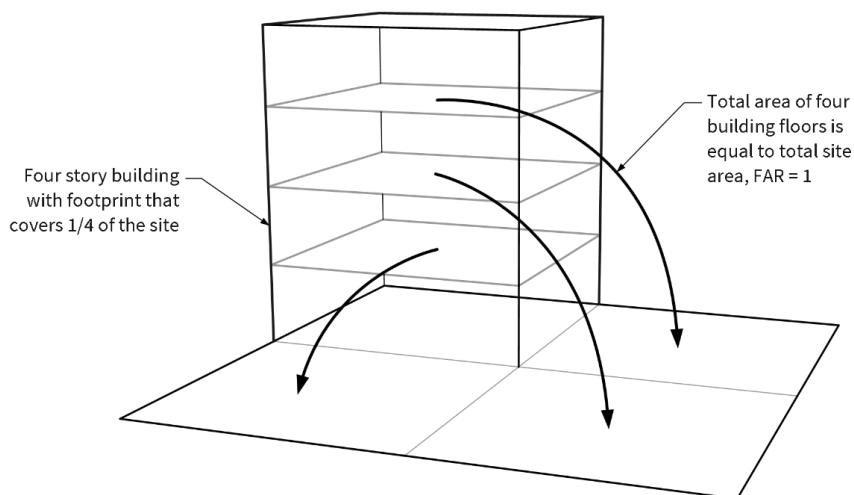
Figure 5. Floor Area Ratio (FAR) is the variable used to define total possible non-residential building space, and effectively caps the size of a building based on the size of the parcel.

These assumptions are applied to the net acreage of each parcel (after removing development constraints) corresponding to its assigned land use category for that alternative, and then summed to reach the final development capacity and conservation numbers for each alternative. For more information on the methodology of the land use alternatives modeling, please see the [Appendix](#).

Table 2. Assumptions for Alternative #1: Continue Current Policies

Land Use Classification	Percentage of Open Space	Percentage of Residential Development to Non-Residential Development	Residential Development (Acres/DU)[6]	Non-Residential Development (FAR)[7]
Urbanizing Residential	33%	75% : 25%	0.5	0.5
Rural Residential	33%	100% : 0%	0.92	n/a
Economic Development Area	n/a	10% : 90%	0.92	0.5
Rural Buffer	33%	95% : 5%	2	0.3
Rural Activity Node	n/a	70% : 30%	0.92	0.5
Mixed Use Center	n/a	n/a	n/a	n/a
Rural Conservation Neighborhood	n/a	n/a	n/a	n/a
Critical Watershed[8]	n/a	100% : 0%	5	n/a
Protected Watershed	n/a	100% : 0%	2	n/a
Low Density Neighborhood	33%	100% : 0%	0.75	n/a

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[6] Based on currently applicable watershed district overlays, Acres/Dwelling Unit is a measure of development density, and the number shown indicates the number of acres in a lot (parcel) required to build a single dwelling unit.

[7] Based on the currently applicable zoning districts.

[8] For more information about the critical and protected watershed assumptions, please see the Appendix.

Table 3. Assumptions for Alternative #2: Enhance Agricultural and Environmental Protections

Land Use Classification	Percentage of Open Space	Percentage of Residential Development to Non-Residential Development	Residential Development (Acres/DU)[9]	Non-Residential Development (FAR)[10]
Urbanizing Residential	33%	75% : 25%	0.5	0.5
Rural Residential	33%	100% : 0%	1	n/a
Economic Development Area	n/a	10% : 90%	2	0.5
Rural Buffer	33%	95% : 5%	5	0.3
Rural Activity Node	n/a	70% : 30%	2	0.5
Mixed Use Center	n/a	n/a	n/a	n/a
Rural Conservation Neighborhood	n/a	n/a	n/a	n/a
Critical Watershed[11]	n/a	100% : 0%	10	n/a
Protected Watershed	n/a	100% : 0%	5	n/a
Low Density Neighborhood	33%	100% : 0%	0.75	n/a

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[9] Based on currently applicable watershed district overlays, Acres/Dwelling Unit is a measure of development density, and the number shown indicates the number of acres in a lot (parcel) required to build a single dwelling unit.

[10] Based on the currently applicable zoning districts.

[11] For more information about the critical and protected watershed assumptions, please see the Appendix.

Table 4. Assumptions for Alternative #3: Add Low-Impact, Rural Conservation Neighborhoods in Strategic Locations

Land Use Classification	Percentage of Open Space	Percentage of Residential Development to Non-Residential Development	Residential Development (acres/DU) [12]	Non-Residential Development (FAR) [13]
Urbanizing Residential	33%	75% : 25%	0.5	0.5
Rural Residential	33%	100% : 0%	0.92	n/a
Economic Development Area	n/a	10% : 90%	0.92	0.5
Rural Buffer	33%	95% : 5%	2	0.3
Rural Activity Node	n/a	70% : 30%	0.92	0.5
Mixed Use Center	n/a	n/a	n/a	n/a
Rural Conservation Neighborhood	60%[14]	90% : 10%	0.25[15]	0.2
Critical Watershed[16]	n/a	n/a	5	n/a
Protected Watershed	n/a	n/a	2	n/a
Low Density Neighborhood	33%	100% : 0%	0.75	n/a

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[12] Based on currently applicable watershed district overlays, Acres/Dwelling Unit is a measure of development density, and the number shown indicates the number of acres in a lot (parcel) required to build a single dwelling unit.

[13] Based on the currently applicable zoning districts.

[14] This represents the midpoint of the recommended range for conservation subdivisions in rural settings, per the guidance of the Conservation Subdivision Handbook published by NC State University and the North Carolina Urban and Community Forestry Program. https://www.ncufc.org/uploads/Conservation_subdivision.pdf

[15] This represents the residential density not inclusive of required open space.

[16] For more information about the critical and protected watershed assumptions, please see the Appendix.

Table 5. Assumptions for Alternative #4: Add Higher Intensity, Mixed-Use Centers in Strategic Locations

Land Use Classification	Percentage of Open Space	Percentage of Residential Development to Non-Residential Development	Residential Development (Acres/DU)* [17]	Non-Residential Development (FAR) [18]
Urbanizing Residential	33%	75% : 25%	0.5	0.5
Rural Residential	33%	100% : 0%	0.92	n/a
Economic Development Area	n/a	10% : 90%	0.92	0.5
Rural Buffer	33%	95% : 5%	2	0.3
Rural Activity Node	n/a	70% : 30%	0.92	0.5
Mixed Use Center	20%	75% : 25%	0.1	0.75
Rural Conservation Neighborhood	n/a	n/a	n/a	n/a
Critical Watershed[19]	n/a	n/a	5	n/a
Protected Watershed	n/a	n/a	2	n/a
Low Density Neighborhood	33%	100% : 0%	0.75	n/a

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[17] Based on currently applicable watershed district overlays, Acres/Dwelling Unit is a measure of development density, and the number shown indicates the number of acres in a lot (parcel) required to build a single dwelling unit.

[18] Based on the currently applicable zoning districts.

[19] For more information about the critical and protected watershed assumptions, please see the Appendix.

Outcomes of Modeled Land Use Alternatives

The modeled outcomes of the land use alternatives are provided on the following pages in tabular and mapped form. These represent "net new" development capacity and conservation areas in Orange County's study area given the assumptions used for each alternative. These calculations do not include existing development. A comparison of outcomes across all alternatives is provided on page 30 of this report.

Table 6. Outcomes of Alternative #1: Continue Current Policies

Land Use Classification	Total Acres in Land Use Classification	Conservation Land (Acres)[20]	Residential Capacity (Total Number of Dwelling Units)	Non-Residential Capacity (Square Feet)
Economic Development Area	2,880	0	193	34,716,358
Low Density Neighborhood	1,261	441	378	0
Rural Activity Node	4,473	0	1,211	13,607,679
Rural Buffer	35,834	13,579	2,168	4,003,063
Rural Residential	161,592	56,983	40,246	0
Urbanizing Residential	10,553	3,586	2,474	16,852,689
Grand Total	**216,593**	**74,589**	**46,669**	**69,179,789**

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[20] Conservation lands are defined as both lands required to be placed in permanent conservation easements (common open space) as well as lands that are in-lot conservation lands and wouldn't be allowed to be developed as part of a private lot.

Figure 6. Map of Modeled Land Use Alternative #1

Land Use Alternative 1

- City Limits
- ETJ
- JPA
- Economic Development Area
- Rural Activity Node
- Rural Buffer
- Rural Residential
- Low Density Neighborhood
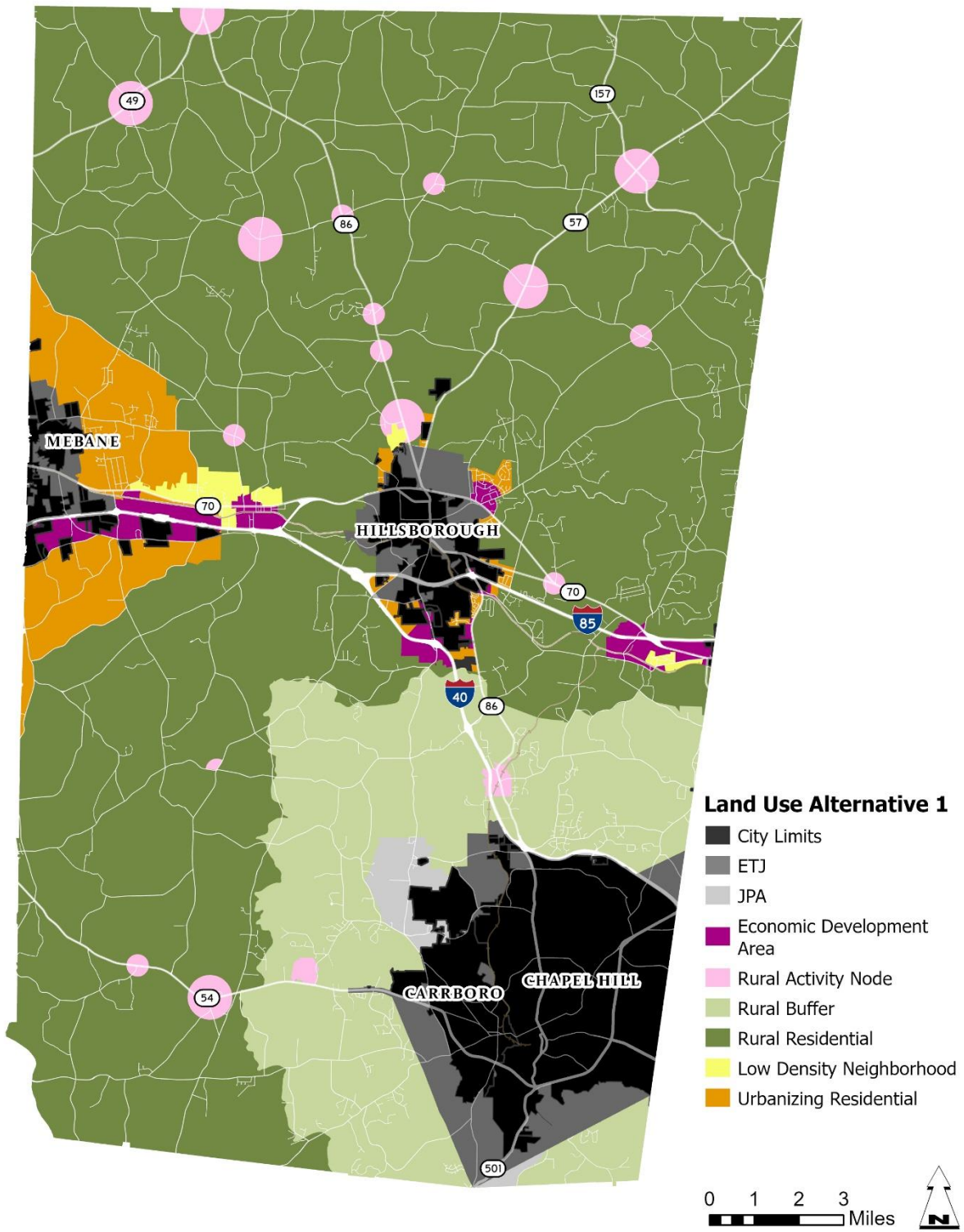- Urbanizing Residential

Table 7. Outcomes of Alternative #2: Enhance Agricultural and Environmental Protections

Land Use Classification	Total Acres in Land Use Classification	Conservation Land (Acres)[21]	Residential Capacity (Total Number of Dwelling Units)	Non-Residential Capacity (Square Feet)
Economic Development Area	2,880	0	89	34,716,358
Low Density Neighborhood	1,261	441	463	0
Rural Activity Node	4,473	0	539	13,607,679
Rural Buffer	35,834	13,579	909	4,003,063
Rural Residential	161,592	56,983	31,871	0
Urbanizing Residential	10,553	3,586	4,497	16,852,689
Grand Total	**216,593**	**74,589**	**38,366**	**69,179,789**

[21] Conservation lands are defined as both lands required to be placed in permanent conservation easements (common open space) as well as lands that are in-lot conservation lands and wouldn't be allowed to be developed as part of a private lot.

Figure 7. Map of Modeled Land Use Alternative #2

Land Use Alternative 2
- City Limits
- ETJ
- JPA
- Economic Development Area
- Rural Activity Node
- Rural Buffer
- Rural Residential
- Low Density Neighborhood
- Urbanizing Residential

0 1 2 3 Miles

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Table 8. Outcomes of Alternative #3: Add Low-Impact, Rural Conservation Neighborhoods in Strategic Locations

Land Use Classification	Total Acres in Land Use Classification	Conservation Land (Acres)[22]	Residential Capacity (Total Number of Dwelling Units)	Non-Residential Capacity (Square Feet)
Economic Development Area	4,247	0	261	50,562,106
Low Density Neighborhood	1,261	441	463	0
Rural Activity Node	4,260	0	1,185	13,116,437
Rural Buffer	34,230	12,962	1,990	3,791,517
Rural Conservation Neighborhood	6,311	3,811	3,490	1,160,204
Rural Residential	156,762	55,368	38,018	0
Urbanizing Residential	9,522	3,245	4,010	14,595,920
Grand Total	**216,593**	**75,827**	**49,417**	**83,226,184**

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[22] Conservation lands are defined as both lands required to be placed in permanent conservation easements (common open space) as well as lands that are in-lot conservation lands and wouldn't be allowed to be developed as part of a private lot.
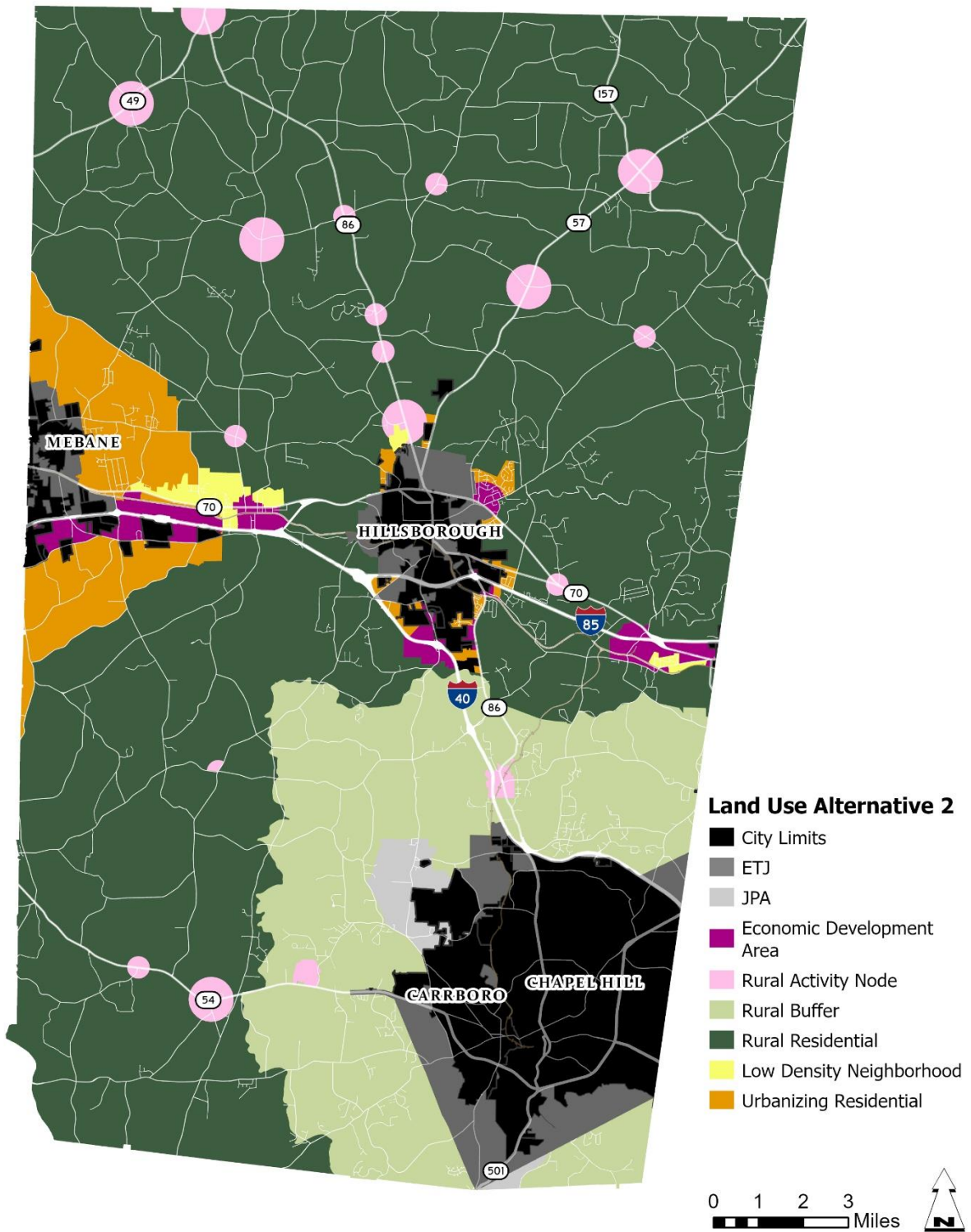
Figure 8. Map of Modeled Land Use Alternative #3
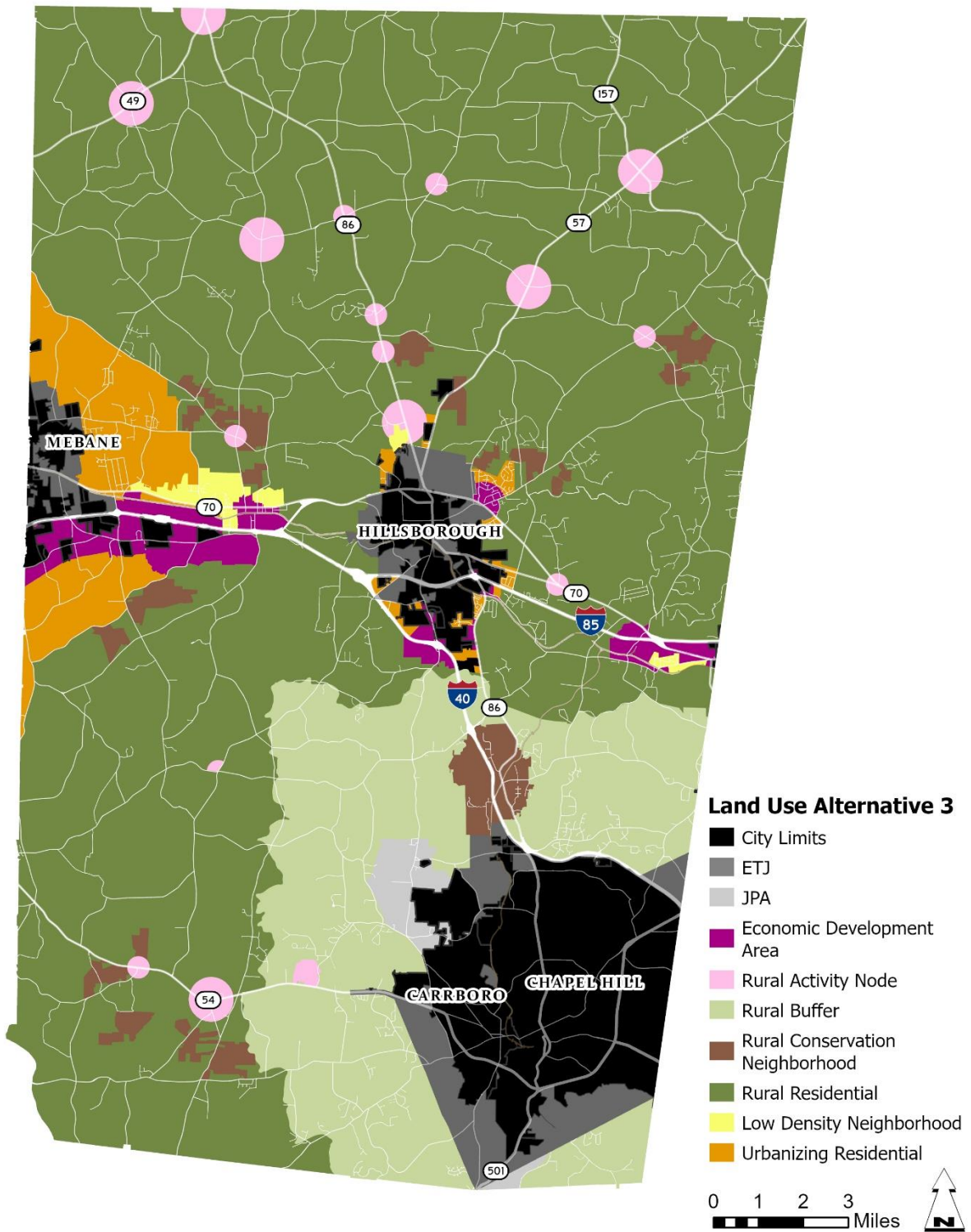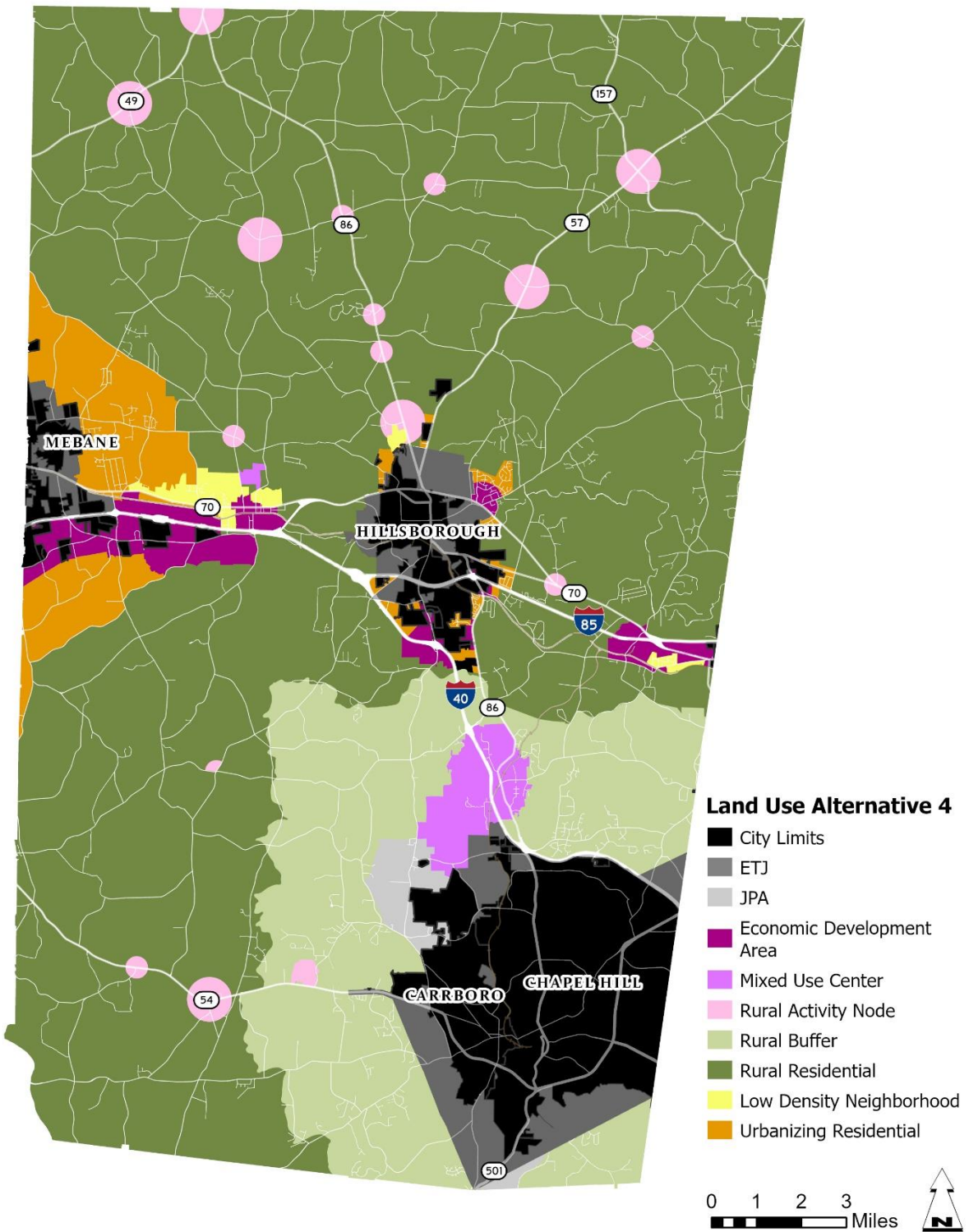

Land Use Alternative 3

- City Limits
- ETJ
- JPA
- Economic Development Area
- Rural Activity Node
- Rural Buffer
- Rural Conservation Neighborhood
- Rural Residential
- Low Density Neighborhood
- Urbanizing Residential

0 1 2 3 Miles

Table 9. Outcomes of Alternative #4: Add Higher Intensity, Mixed-Use Centers in Strategic Locations

Future Land Use Classification	Total Acres in Land Use Classification	Conservation Land (Acres)[23]	Residential Capacity (Total Number of Dwelling Units)	Non-Residential Capacity (Square Feet)
Economic Development Area	4,247	0	261	50,562,106
Low Density Neighborhood	1,261	441	463	0
Mixed Use Center	2,948	807	712	4,257,212
Rural Activity Node	4,260	0	1,334	14,800,783
Rural Buffer	33,224	12,624	1,981	3,779,276
Rural Residential	161,131	56,831	40,097	0
Urbanizing Residential	9,522	3,245	4,010	14,595,920
Grand Total	**216,593**	**73,947**	**48,860**	**87,995,297**

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[23] Conservation lands are defined as both lands required to be placed in permanent conservation easements (common open space) as well as lands that are in-lot conservation lands and wouldn't be allowed to be developed as part of a private lot.

Figure 9. Map of Modeled Land Use Alternative #4

Land Use Alternative 4
- City Limits
- ETJ
- JPA
- Economic Development Area
- Mixed Use Center
- Rural Activity Node
- Rural Buffer
- Rural Residential
- Low Density Neighborhood
- Urbanizing Residential

Comparison of Outcomes Across Alternatives

The modeled land use alternatives have been compared across three outcomes: acres of conservation lands, residential capacity (dwelling units), and non-residential capacity (in square feet). A table and bar graphs summarizing these outcomes are provided below.

Table 10. Summary of Outcomes Across Alternatives

Land Use Alternative	Conservation Land (Acres)[24]	Residential Capacity (Total Number of Dwelling Units)	Non-Residential Capacity (Square Feet)
Alternative #1	74,589	46,669	69,179,789
Alternative #2	74,589	38,366	69,179,789
Alternative #3	75,827	49,417	83,226,184
Alternative #4	73,947	48,860	87,995,297

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[24] Conservation lands are defined as both lands required to be placed in permanent conservation easements (common open space) as well as lands that are in-lot conservation lands and wouldn't be allowed to be developed as part of a private lot. For more information on how this was modeled, please see the Appendix.

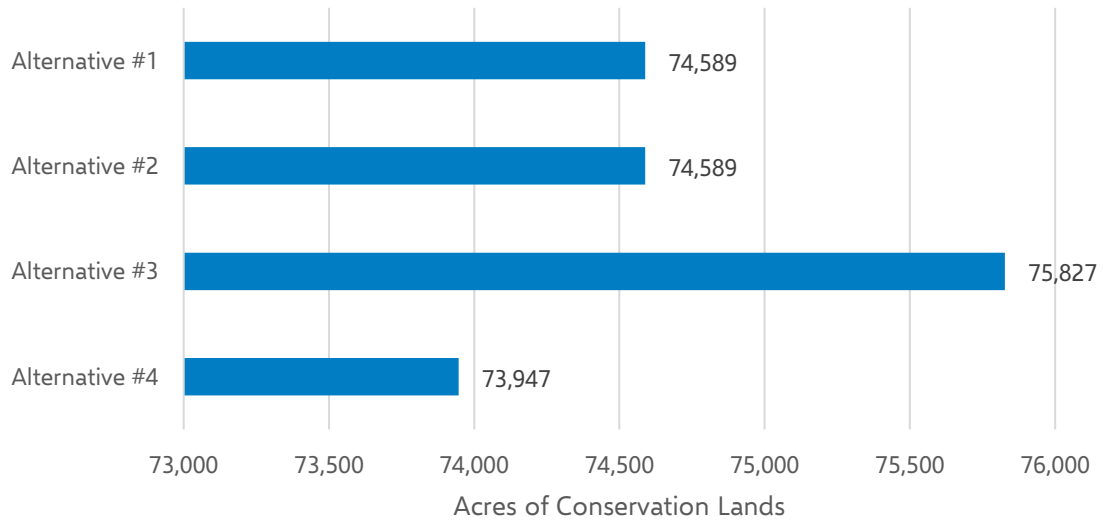## Figure 10. Acres of Conservation Lands Resulting from Each Alternative

Alternative	Acres of Conservation Lands
Alternative #1	74,589
Alternative #2	74,589
Alternative #3	75,827
Alternative #4	73,947

Acres of Conservation Lands

Figure 11. Residential Capacity (Dwelling Units)

Alternative	Number of Dwelling Units
Alternative #1	46,669
Alternative #2	38,366
Alternative #3	49,417
Alternative #4	48,860

Number of Dwelling Units
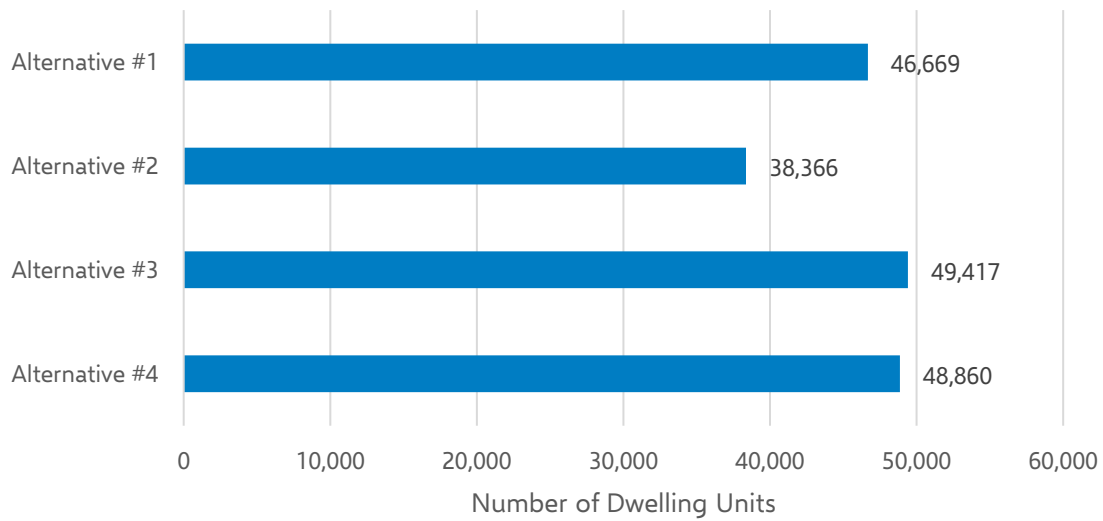
Figure 8. Nonresidential Capacity (Square Feet)

Alternative	Square Feet of Nonresidential Capacity
Alternative #1	69,179,789
Alternative #2	69,179,789
Alternative #3	83,226,184
Alternative #4	87,995,297
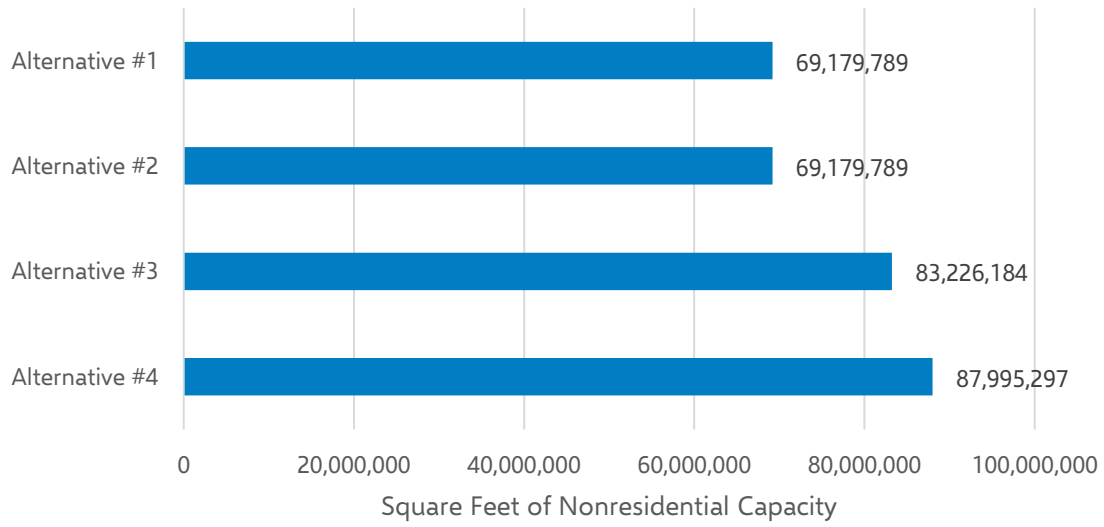
STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND CHALLENGES ANALYSIS (SWOC)

To evaluate the alternatives, a SWOC (strengths, weaknesses, opportunities, and challenges) analysis was conducted to assist with understanding the tradeoffs of each alternative. The SWOC analysis considers high-level impacts and is intended to provide a generalized sense of how each alternative might unfold, not a comprehensive accounting of all possible effects.

Land Use Alternative #1

STRENGTHS	WEAKNESSES
• Maintains the current Joint Planning Area Agreement and the Rural Buffer with the Towns of Chapel Hill and Carrboro • Incorporates the current growth plan for Hillsborough (a reduction from the previous FLUM) and identifies the potential growth area for Mebane	• Does not include further protections for wildlife conservation corridors • Affordable housing and diverse housing types would need to be developed in the municipalities where utilities are provided and where the County has partnerships but does not have direct authority • Doesn't provide any new opportunities for economic development and balancing the local tax base
OPPORTUNITIES	**CHALLENGES**
• Established Economic Development Areas are opportunities for growing jobs and the local tax base • Rural conservation subdivisions are an option for developments that permanently conserve common open space via a 33% set-aside, which is then owned and maintained by the HOA of the development.	• Established rural densities are viewed by some as supporting rural sprawl and per the American Farmland Trust, poses a risk to prime, viable farmlands • Results in lower total of housing units and non-residential square footage compared to Alternatives #3 and #4 • Eno Economic Development Area does not have any feasible utility prospects, limiting the opportunity to maximize job growth

Land Use Alternative #2

STRENGTHS	WEAKNESSES
• Maintains the integrity of the Joint Planning Area Agreement and the Rural Buffer with the Towns of Chapel Hill and Carrboro • Incorporates the current growth plan for Hillsborough (a reduction from the previous FLUM) and identifies the potential growth area for Mebane • Improves protections for Critical and Protected Water Supply Watershed lands and lands with the highest quality agricultural soils • Significant reduction in density of new development countywide may reduce the climate and environmental impacts within rural areas. This is due to additional land conserved as open space in a natural, or unbuilt, state – limiting impervious surfaces and also reducing vehicle miles travelled with fewer people living in the unincorporated areas.	• Restrictive development policies and densities could limit the amount of housing supply developed countywide, further challenging the affordable housing issue • Affordable housing and diverse housing types would need to be developed in the municipalities where the County has partnerships but does not have direct authority • Workers that can't afford to live in Orange County may have to live in other counties and increase traffic congestion on roads
OPPORTUNITIES	CHALLENGES
• Farmland preservation efforts could be enhanced by the reduction of development pressures in rural areas • Established Economic Development Areas are opportunities for growing jobs and the local tax base • Rural conservation subdivisions are still an option for development that permanently conserve common open space via a set-aside (33%), which is then owned and maintained by the HOA of the development.	• Lower capacity for housing units and non-residential square footage compared to other Alternatives • Due to shrinking development potential, this alternative places the fiscal burden of increasing costs to provide public services and amenities onto existing residential homeowners that provide the majority share of property taxes • Eno Economic Development Area does not have any feasible utility prospects, limiting the opportunity to maximize job growth

Land Use Alternative #3

STRENGTHS	WEAKNESSES
• Incorporates the current growth plan for Hillsborough (a reduction from the previous FLUM) and identifies the potential growth area for Mebane • Results in the largest capacity for conservation land compared to all other alternatives due to the requirement for a significant open space set aside (60%) in Rural Conservation Neighborhoods. • Trades smaller lot sizes for permanent protection of more common open space that protect the most critical areas of sites • Permanent protection of open space in Rural Conservation Neighborhoods would better protect high-value conservation corridors and water supply watershed lands than larger lot sizes in #1 • New economic development opportunities near Efland could reduce the burden on local residents and existing business owners to pay for increasing costs to provide public services	• Would require agreements from all three parties of the Joint Planning Agreement (JPA) to allow for Rural Conservation Neighborhoods in the Rural Buffer and any extensions of utilities within the Rural Buffer • Would have a level of impact on the rural character of the county; however, appropriate design standards could mitigate impacts
OPPORTUNITIES	**CHALLENGES**
• May provide new housing opportunities that could be more affordable to workers employed in the county • Significantly increases the capacity for non-residential development, potentially supporting employment opportunities closer to homes, and potentially reducing Vehicle Miles travelled (VMTs) • Expanded development opportunities in Blackwood Station could be supported by transit and support extension of BRT north of Chapel Hill	• Would require explicit policies to allow for private water and wastewater systems in rural Orange County, which carry long-term maintenance and operational risks Eno Economic Development Area does not have any feasible utility prospects, limiting the opportunity to maximize job growth

Land Use Alternative #4

STRENGTHS	WEAKNESSES
- Incorporates the current growth plan for Hillsborough (a reduction from the previous FLUM) and identifies the potential growth area for Mebane - Has the highest potential for creating a diversity of housing types of all four alternatives - New economic development opportunities could reduce the burden on local residents and existing business owners to pay for increasing costs to provide public services	- Would require agreements from all three parties of the Joint Planning Agreement (JPA) to allow for Mixed Use Centers in the Rural Buffer and for all parties of the WASMPBA to allow for extension of utilities within the Rural Buffer - Would have an impact on the rural character of the county; however, appropriate design standards could help mitigate impacts
OPPORTUNITIES	CHALLENGES
- Two strategic sites could provide a significant number of new housing units and provide more housing choices that may lead to more affordable options available to workers employed in the county - Expanded development opportunities in Blackwood Station could be supported by transit and support extension of BRT north of Chapel Hill - Significantly increases the capacity for non-residential development, potentially supporting employment opportunities closer to homes (and potentially reducing VMTs) in Orange County	- Would likely require extension of public utility systems, which are currently not planned to serve these areas and carry significant costs - Eno Economic Development Area does not have any feasible utility prospects, limiting the opportunity to maximize job growth

NEXT STEPS

Public Engagement: Community Engagement Window #2

This report shares the methodology and outcomes of the land use alternatives process that will be utilized in developing the policy guidance for the Land Use Plan 2050.

The information in this report will be the foundation for developing a scorecard about the land use alternatives and preparing public engagement questions. This information will be shared with the public during Community Engagement Window #2 (CEW#2) – Shaping Our Future, when community members will have the opportunity to submit their comments and feedback on their preferences for various aspects of each land use alternative.

CEW#2 is scheduled to launch in September 2024 and will include opportunities for public engagement through early November 2024. Please keep an eye on the project website for updates and ways to participate.

Following the completion of CEW#2, feedback received from the public will be analyzed and incorporated into the Land Use Plan 2050, including the plan's policy guidance and Conservation and Growth Map (i.e. the Future Land Use Map).

APPENDIX

Process for Developing Land Use Alternatives

The process for developing the land use alternatives was completed in five steps.

- First, Community Engagement Window #1 solicited feedback from Orange County residents in a survey format about their priorities for land use in the coming decades. This collective input directly informed the policy direction explored in each alternative.

- Next, Orange County staff worked with Clarion Associates and their subcontractors to synthesize existing land use, planning initiatives, and plans for local municipalities; identify potential areas of change; and integrate guidance from staff expertise to further refine the approach for each alternative.

- Following this, Orange County staff and the consultant team met with the Staff Working Group, comprised of leadership from multiple Orange County departments to review the work in progress. The teams ensured that relevant local plans, initiatives, and studies (such as priorities from the Strategic Plan, Climate Action Plan, the Eno-New Hope Landscape Conservation Plan, transit and transportation plans, and agricultural lands with prime soils) are reflected in the alternatives. Staff Working Group members also assisted with necessary data collection for this process.

- Orange County staff and the consultant team met with the Board of County Commissioners to brief them on the process and land use alternatives approach, as well as the general assumptions used in modeling.

- Finally, in close coordination with Orange County staff, the modeling and reporting were completed, using geographic mapping information systems (GIS) to assign categories to parcels for each alternative and Microsoft Excel to perform the calculations that yield capacity numbers.

Methodology

This section provides a technical step-by-step accounting of the Land Use Alternatives preparation and testing. ArcGIS Pro was used for the initial preparation of data and for creating the maps of each land use alternative. Microsoft Excel was used to run the calculations and produce the modeled outputs of new conservation lands, residential capacity, and non-residential capacity. These steps include:

- Step 1: Modify Land Use Classifications for Alternatives
- Step 2: Prepare Baseline Inventory of Potential Development Areas
- Step 3: Confirm and Model Development Constraints
- Step 4: Prepare Model Assumptions

- Step 5: Compare Open Space Protection, Development Capacity, and Outcomes of Alternatives

Step 1: Modify Land Use Classifications for Alternatives

The Future Land Use Map classifications from the 2030 Comprehensive Plan were modified and reorganized, including combining classifications that were very similar and updating the classification names to better reflect their intent. A summary of the changes can be seen in the table below. A description of each land use classification is provided in the main body of this report.

Table 11. Modifications to Future Land Use Classifications for Land Use Alternatives

2030 Comprehensive Plan: Classification Name	Land Use Alternatives: Updated Classifications
--	Mixed Use Center *(new category)*
Commercial Transition Activity Node	Economic Development Area
Commercial-Industrial Transition Activity Node	Economic Development Area
Economic Development Transition Activity Node	Economic Development Area
10-Year Transition	Low Density Neighborhood OR Urbanizing Residential*
20-Year Transition	Low Density Neighborhood OR Urbanizing Residential*
Rural Community Activity Node	Rural Activity Node
Rural Industrial Activity Node	Rural Activity Node
Rural Neighborhood Activity Node	Rural Activity Node
--	Rural Conservation Neighborhood *(new category)*
Rural Residential	Rural Residential
Rural Buffer	Rural Buffer
Agricultural Residential	Rural Residential
*Lands within the 10-year and 20-year Transition Areas have been reclassified to 'Low Density Neighborhood' if they are located outside of Hillsborough's defined growth area or outside of the long-range study area for Mebane. Lands within those boundaries are reclassified as 'Urbanizing Residential.'	

Step 2: Prepare Baseline Inventory of Potential Development Areas

For this analysis, only parcels within Orange County's jurisdiction were used – any parcel within a municipality was removed from the parent parcel shapefile, as well as 10- and 20-year Transition Areas within the Joint Planning Area (JPA). Orange County staff then performed a union operation in GIS between the parcel layer and the Future Land Use (FLU) layer, effectively "splitting" parcels where their respective boundaries do not align. This allows for more precise modeling of these parcels that straddle FLU (Future Land Use) boundaries, as each part of the parcel can be modeled under its assigned FLU category. This operation "split" ~1,250 parcels into ~2,500 parcel polygons – most of the impacted parcels were split into two polygons, while some were split into three. For the sake of simplicity and clarity in this report, we still refer to these "parcel polygons" as parcels.

Orange County staff assigned a *Development Status* to each parcel, and a corresponding *Percent Developed* to each parcel. The Development Status shapefile was originally built in 2019 as a component of the 2050 Metropolitan Transportation Plan ([DCHCMPO and CAMPO](#)) and was updated by County staff for this process. County GIS Staff used the County's certificate of occupancy data as of January 2024 to update any parcel that was listed as undeveloped in the original data. Development status was not updated for parcels within municipal jurisdictions. The Development Statuses are defined as follows:

- **Developed**: already built and cannot accept additional growth.
- **Committed or Asserted**: new growth manually assigned based on buildings under construction and anchor institution plans.
- **Undeveloped**: can accept new growth up to the capacity of the applicable future land use category.
- **Under-developed**: Can add development to what is already there (each parcel with this status will include a designated percentage of the parcel capacity that is developed and cannot accept more growth).
- **Re-developable**: Can accept new growth up to the capacity of the applicable future land use category and will subtract out any existing development that would be removed to accommodate new development.
- **Agriculture**: existing use of agriculture, will be modeled based on the Percent Developed.
- **Protected Open Space**: parcels with permanent conservation protections.

In addition to the Occupancy database, several "rules" were used when updating the development status of parcels:

- For parcels currently within the Rural Buffer: An existing structure was coded as "developed," regardless of lot size.
- For parcels currently classed as Agricultural Residential and Rural Residential on the Future Land Use map:
  - If an existing structure is on a lot <20 acres in size, code as "developed".
  - If an existing structure is on a lot >20-40 acres in size, code as "underdeveloped" and 50% for % Developed 2045.
  - If an existing structure is on a lot >40-100 acres in size, code as "underdeveloped" and 25% for % Developed 2045.
  - If an existing structure is on a lot >100 acres in size, code as "underdeveloped" and 10% for % Developed 2045.

Table 12. Development Status Assignments of the Parcel Layer

Development Status	Number of Parcels	Total Acres
Agriculture	2,639	64,634
Asserted Development	8	299
Committed	1	2
Developed	18,976	68,961
Protected Open Space	782	20,993
Re-developable	300	1,333
Underdeveloped	1,057	35,390
Undeveloped	4,215	28,110
Water	6	33

Step 3: Confirm and Model Development Constraints

For this analysis, the presence of floodplains or steep slopes (defined in this exercise as >=30°grade) are considered development constraints that effectively prevent development on those areas of the parcel. County staff updated the attribute table of the working parcel layer by tabulating the total constrained area, in acres, of each parcel. These values were subtracted from the total acreage of the parcel to produce a net buildable area for each parcel, which in conjunction with a development density per the applicable classifications, is used to determine the capacity of the parcel.

Step 4: Prepare Modeling Assumptions

Modeling assumptions were developed by the staff and consultant teams working together to make informed changes to the existing zoning regulations that dictate development, adjusting each assumption in accordance with the policy direction of that alternative. The assumptions for each alternative are outlined below, and in the tables on pages 18.

- **Conservation Land:** Alternatives #1 and #2 show the same amount of conservation land because the two maps are identical with respect to the geography of land use categories. The only difference between the two is the density applied per parcel, by category (the open space assumptions are the same). To determine capacity by parcel, the model first removes the constrained land area (acres) of each parcel, then pulls out the open space percentage by parcel. The model assumes that constrained land area would encompass the open space set-aside in a real development (floodplains and steep slopes). If the constrained area was less than the open space assumption (33%), then it is increased to meet that threshold. If the original constrained area was more than 33% of the parcel, no additional open space was removed. This step occurred before applying residential and nonresidential growth assumptions. Thus, each parcel had the same set-aside of conservation land before resulting in the stage of calculating capacity based on the growth assumptions.
- **Critical and Protected Watershed:** For all land use alternatives, before the residential and non-residential densities were applied to all categories by alternative, the critical and protected water supply/watershed boundaries were used to apply a separate residential density for the parcels within the boundaries.
- **Open Space:** For all land use alternatives, the respective density for residential capacity (acres/dwelling unit) is calculated after open space and constraints are removed from parent parcel.
- **Rural Conservation Neighborhoods:** Rural Conservation Neighborhoods have 60% required open space set aside. This represents the midpoint of the recommended range for conservation subdivisions in rural settings, per the guidance of the Conservation Subdivision Handbook published by NC State University and the North Carolina Urban and Community Forestry Program.

Step 5: Comparing Open Space Protection, Development Capacity, and Outcomes of Alternatives

After the parcel-based maps are created for each alternative, their attribute tables are exported in spreadsheet form, allowing for batch calculations to occur on all parcels by applying the

densities, floor area ratio (FAR), and open space assumptions to each land use category and using pivot tables to aggregate the totals.

MTP 2050 Growth Projections

The Central Pines Regional Council (CPRC, formerly Triangle J Council of Governments) supports regional planning and provides technical expertise to local governments and partners in Chatham, Durham, Johnston, Lee, Moore, Orange, and Wake Counties. As part of this technical expertise, CPRC is responsible for producing and maintaining the CommunityViz Land Use Model which produced population and employment projections for the 2050 Metropolitan Transportation Plan (MTP). The 2050 MTP population and employment projects are useful to provide additional context about modeling capacity for development, in relation to the outcomes of the Land Use Alternatives. The 2050 MTP provides both **modeled capacity** and an **allocation** for employment and dwelling units. Modeled capacity is a theoretical capacity of housing units that could be built or non-residential development that could occur, without consideration of real-world constraints. In comparison, the allocation of population and employment takes into account a control total for what is a more realistic expectation and is developed using advanced modeling and locational analysis to provide a better picture of development that could occur on the ground.

Modeled Capacity

- **Total Employment Capacity:** The total amount of all employment categories including committed and asserted development, according to the MTP 2050
- **Total Dwelling Unit Capacity:** The total amount of multi-family and single-family units including committed and asserted development according to the MTP 2050

Table 13. 2050 MTP Modeled Capacity

Jurisdiction	Total Employment Capacity (Number of Employees)	Total Dwelling Unit Capacity
City of Durham	21,000	3,048
City of Mebane	11,371	1,675
Town of Carrboro	4,533	3,313
Town of Chapel Hill	95,742	29,585
Town of Hillsborough	27,212	10,271
Unincorporated Orange County	501,612	19,130
Grand Total	**661,470**	**67,022**

Allocation

- **Total Dwelling Unit Allocation:** The total amount of dwelling units that can be added between 2020 and 2050, including committed and asserted development according to the MTP 2050.

- **Allocation of Population in All Dwelling Units:** The total population in dwelling units that will be added between 2020 and 2050 according to the MTP 2050.

- **Total Employment Allocation**: The total amount of employment that will be added between 2020 and 2050, including committed and asserted development according to the MTP 2050.

- **Total Employment:** The total amount of employment (in square feet) calculated from the MTP 2050 Total Employment Allocation, converted from number of employees by utilizing the Institute of Transportation Engineers Employees Per Demand Unit by Land Use Group.

Table 12. 2050 MTP Allocation

Jurisdiction	Total Dwelling Unit Allocation	Allocation of Population in All Dwelling Units	Total Employment Allocation (Number of Employees)[25]	Total Employment (Square Feet)[26]
City of Durham	1,025	2,737	1,631	1,119,410
City of Mebane	946	2,526	574	393,955
Town of Carrboro	755	1,944	308	211,391
Town of Chapel Hill	10,145	22,909	36,923	25,341,486
Town of Hillsborough	3,536	9,213	1,111	762,516
Unincorporated Orange County	1,867	4,985	1,500	1,029,500
Grand Total	18,274	44,314	42,047	28,858,258

The differences between the MTP 2050 model and this Land Use Alternatives effort are due to the different assumptions and model parameters that were used. While these two exercises are similar in that both produced theoretical land use capacities of the same metrics (housing and non-residential development), they were not intended to be duplicative. Instead, each model illustrates trends and lends insights to the types of minor adjustment to land use regulations (e.g. density or FAR requirements) that have an impact on these variables. For more information about the MTP 2050 model and process, please refer to the 2050 MTP.

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[25] 2050 MTP Allocation

[26] 2050 Land Use Plan Conversion based on the Institute of Transportation Engineers Land Use Group – Employees Per Demand Unit (11th Edition, 2021).